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EXAMINER

WANG, JIN CHENG

ART UNIT PAPER NUMBER

2672

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

**Application No.**

10/091,384

**Applicant(s)**

OBEROI ET AL.

**Examiner**

Jin-Cheng Wang

**Art Unit**

2672

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 14 July 2004.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1, 3-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

**DETAILED ACTION**

***Claim Rejections - 35 USC § 102***

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claim 15 is rejected under 35 U.S.C. 102(b) as being anticipated by Poole et al. U.S.

Patent No. 5,798,767 (hereinafter Poole).

3. Claim 15:

Poole teaches a re-configurable circuit capable of performing a multitude of graphics data transforming operations, wherein each configuration of said re-configurable circuit comprises:

A selected set of circuit elements, wherein each selected set is a subset of a group of circuit elements, and wherein the group of circuit elements comprises:

One or more subtractors coupled to receive two data inputs (e.g., See the subtractors 160, 180 and 210 of Figure 7; See also Figures 8A-8C, and 3-4 receiving two data inputs);

One or more adders coupled to receive two data inputs (e.g., See the adders 164, 184 and 214 of Figure 7. See also Figures 8A-8C, and 3-4 receiving two data inputs);

One or more shifters (column 11-12);

One or more multipliers coupled to receive a data input and an output of another circuit elements (e.g., See the multipliers 162, 182, 212 of Figure 7; See also Figures 8A-8C, 3-4);

A plurality of multiplexors whose outputs are coupled to data inputs of other circuit elements A first multiplexor whose output drives the first input (e.g., *See the first multiplexor Tex\_g connecting to the subtractor 180 of Figure 7; See also Figures 8A-8C, 3-4 wherein output of the first multiplexor drives the input of other circuit elements; See the multiplexor Fog\_Mult or the multiplexor 194 connecting to the multiplier 162 or 182 of Figure 7 wherein the third multiplexor whose output drives the input of other circuit elements. See also Figures 8A-8C; See the multiplexor 196 connecting to the adder 184 in Figure 7 wherein the fourth multiplexor whose output drives the input of the other circuit elements. See also Figures 8A-8C*);

An operation register, wherein a set of one or more values stored in the operation register specifies a specific graphics data transforming operation (*Poole further discloses control signal YUV2RGB, PASS, etc. from the State Machine 146 which control selection lines of the first, second, third and fourth multiplexors; e.g., Figure 4, 5A-5B, 7-8C, column 5-6*); and

Control logic configured to implement the operation specified in the operation register (at least two configurations are disclosed in Poole, i.e., YUV2RGB is asserted when color space conversion is requested and the PASS signal is asserted when neither color space conversion nor fog effect is requested; column 5 wherein the State Machine 146 specifies the operation mode; column 5-6), by driving selection lines for each of the plurality of multiplexors to interconnect

Art Unit: 2672

the selected set of circuit elements and data inputs corresponding to the specified configuration (Poole further discloses control signal YUV2RGB, PASS, etc. from the State Machine 146 which control selection lines of the first, second, third and fourth multiplexors; e.g., Figure 4, 5A-5B, 7-8C, column 5-6).

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 3-5, 7-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poole et al. U.S. Patent No. 5,798,767 (hereinafter Poole).

6. Claim 1:

(a) Poole teaches a re-configurable circuit capable of performing a multitude of graphics data transforming operations, said circuit comprising:

A set for circuit elements comprising:

A subtractor coupled to receive a first input and second input (e.g., See the subtractor 160, 180 and 210 of Figure 7; See also Figures 8A-8C, and 3-4);

A multiplier coupled to a third input and an output of the subtractor (e.g., See the multiplier 162, 182, 212 of Figure 7; See also Figures 8A-8C, 3-4);

Art Unit: 2672

An adder coupled to a fourth input an output of the multiplier (e.g., See the adder 164, 184 and 214 of Figure 7. See also Figures 8A-8C, and 3-4);

A first multiplexor whose output drives the first input (e.g., See the first multiplexor Tex\_g connecting to the subtractor 180 of Figure 7; See also Figures 8A-8C, 3-4);

A second selection whose output drives the second input (e.g., See FogColor\_g connecting to the subtractor 180 of Figure 7. Note that FogColor\_g is selectable. See also Figures 8A-8C; column 7, lines 5-12; column 7, lines 60-67; column 8, lines 44-50);

A third multiplexor whose output drives the third input (e.g., See the multiplexor Fog\_Mult or the multiplexor 194 connecting to the multiplier 162 or 182 of Figure 7. See also Figures 8A-8C);

A fourth multiplexor whose output drives the fourth input (e.g., See the multiplexor 196 connecting to the adder 184 in Figure 7. See also Figures 8A-8C);

An operation register, wherein a set of one or more values stored in the operation register specifies a specific graphics data transforming operation (*Poole further discloses control signal YUV2RGB, PASS, etc. from the State Machine 146 which control selection lines of the first, second, third and fourth multiplexors; e.g., Figure 4, 5A-5B, 7-8C, column 5-6*); and

Control logic configured to implement a configuration of the circuit elements (*at least two configurations are disclosed in Poole, i.e., YUV2RGB is asserted when color space conversion is requested and the PASS signal is asserted when neither color space conversion nor fog effect is requested; column 5*) corresponding to the operation specified in the operation register (*the State Machine 146 specifies the operation mode; column 5-6*), and to drive selection

Art Unit: 2672

lines of the first, second, third and fourth multiplexors in response to the set of one or more values in the operation register (*Poole further discloses control signal YUV2RGB, PASS, etc. from the State Machine 146 which control selection lines of the first, second, third and fourth multiplexors; e.g., Figure 4, 5A-5B, 7-8C, column 5-6*).

(b) However, Poole does not implicitly teaches a second multiplexor whose output drives the second input.

(c) It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated multiplexor into the Poole's circuit because such a construction would have provided a means for selection of input values as suggested in Poole (Figures 7-8C, column 7, lines 5-12; column 7, lines 60-67; column 8, lines 44-50) wherein the circuit of Poole can be implemented into two modes, i.e., fog mode and color space conversion mode. Poole's circuit involves a selection of values for the second input, FogColor\_\_c, FogColor\_\_g, FogColor\_\_b, because these fog colors take different values under different mode of operations and therefore a multiplexor should be used for such a selection which provides input to the subtractor.

(d) Such modification would have been required to provide a selection for the input values for the subtractor of the Poole's circuit (Figures 7-8C).

### Claim 3:

As per Claim 3, Poole further discloses the first multiplexor passes a color value such as Tex\_g to the first input, the second selector passes a color value such as FogColor\_\_g, to the second input, the third multiplexor passes an alpha value such as Fog\_Mult, to the third input and

Art Unit: 2672

the fourth multiplexor passes the color value such as FogColor\_\_g to the fourth input (e.g., Figure 7-8c, column 6-8).

Claims 4-5:

The Claims 4-5 recite similar limitation to that set forth in the Claim 3. The Claims 4-5 are subject to the same rationale of rejection set forth in the Claim 3.

Claim 7:

The Claim 7 recites similar limitation to the Claims 1 and 3. The Claim 6 is subject to the same rationale of rejection set forth in the Claims 1 and 3.

Claim 8:

The claim 8 is subject to the same rationale of rejection set forth in the Claim 1.

Claim 9:

The claim 9 encompasses the same scope of invention as that of claim 8 except additional claimed limitation of the color depth precision of the data stored in the accumulation buffer being larger than color depth precision of the data stored in the image buffer.

However, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit. Poole addresses the number of bits in the pixels associated with the image buffer and the accumulation buffer (e.g., Figure 2-4; 7-8c, column 3-9).

Claim 10:



The claim 10 encompasses the same scope of invention as that of claim 8 except additional claimed limitation of one or more circuit elements configured to transfer the stream of output pixels to one or more programmable destinations.

However, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit (e.g., Figure 2-4; 7-8c, column 6).

Claim 11:

The claim 11 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of one of the programmable destinations being the accumulation buffer.

However, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit. The Examiner interprets the accumulation buffer as the data storage memory such as the data cache 106 and the write data queue 142 of Poole (e.g., Figure 2-4; 7-8c, column 6).

Claim 12:

The claim 12 encompasses the same scope of invention as that of claim 10 except additional claimed limitation of one of the programmable destinations being the image buffer.

However, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit. The Examiner interprets the image buffer as

Art Unit: 2672

the data storage memory such as the data cache 106 and the write data queue 142 of Poole (e.g., Figure 2-4; 7-8c, column 6).

Claim 13:

The claim 13 encompasses the same scope of invention as that of claim 8 except additional claimed limitation of the programmable operation being one or more of an addition operation, a multiply operation, an accumulate operation, a dynamic blending operation, a matrix-vector multiplication, a load operation and a return operation.

However, Poole further discloses a mixture of such operations (e.g., Figure 2-4; 7-8c, column 6-9).

Claim 14:

The claim 14 encompasses the same scope of invention as that of claim 13 except additional claimed limitation of one or more of the re-configurable circuits comprising an accumulator register for accumulating sums over multiple of the computational cycles.

However, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit. The Examiner interprets the accumulator register as the data storage memory such as the data cache 106 and the write data queue 142 of Poole (e.g., Figure 2-4; 7-8c, column 6-9).

7. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Poole et al. U.S. Patent No. 5,798,767 (hereinafter Poole) in view of Buckley et al. U.S. Patent No. 6,104,836 (hereinafter Buckley).

8. Claim 6:

(a) The Claim 6 encompasses the same scope of invention as that of the claim 1 except additional claim limitation of an input line to the accumulator register coupled to the output of the adder, wherein an output line of the accumulator register couples to an input of the fourth multiplexor.

(b) Poole does not implicitly teaches the claim limitation of an input line to the accumulator register coupled to the output of the adder, wherein an output line of the accumulator register couples to an input of the fourth multiplexor.

(c) However, Buckley teaches the claim limitation of an input line to the accumulator register coupled to the output of the adder, wherein an output line of the accumulator register couples to an input of the fourth multiplexor (Buckley Figure 4; column 4-5).

(d) It would have been obvious to one of ordinary skill in the art at the time the invention was made to have incorporated the path from the accumulator register coupled to the multiplexor of Buckley into the Poole's circuit because such a construction would have provided a fed-back path so that the output of the accumulator can be fed back to the input of the adder.

Moreover, Poole further discloses data cache 106 storing the color values originated from RAM 110 and a write data queue 142 storing the outputs of the processed color values and the data values can be fed back to the pixel transfer unit (Poole figures 2-4) and therefore Poole suggests a fed back path to the circuit.

(e) Such modification would have been required to provide the circuit architecture to calculate multiple sums at a number of clock cycles (Buckley column 3-5).

***Remarks***

9. Applicant's arguments, filed 07/14/2004, have been fully considered but they are not deemed to be persuasive.
10. Applicant argues in essence with respect to the Claim 1 and similar claims that:
- (A) "Poole neither teaches nor suggests using a reconfigurable circuit to perform multiple operations on graphics data. Figure 4 of Poole clearly shows a pixel pipeline that uses six separate single purpose circuits to perform six different graphics data operations. In fact, the work reconfigure is not used anywhere in Poole."

In response to the arguments in (A) and similar arguments as presented in applicant's response, Poole discloses control signal YUV2RGB, PASS, etc. from the State Machine 146 which control selection lines of the plurality of multiplexors (e.g., Figure 4, 5A-5B, 7-8C, column 5-6). Poole further discloses at least two configurations of the circuits, for example YUV2RGB is asserted when color space conversion is requested and the PASS signal is asserted when neither color space conversion nor fog effect is requested; column 5; corresponding to the operation specified in the State Machine 146.

***Conclusion***

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

Art Unit: 2672

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (703) 605-1213. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mike Razavi can be reached on (703) 305-4713. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Application/Control Number: 10/091,384

Page 13

Art Unit: 2672

jcw



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